

DESCRIPTIONS OF NINE NEW MAMMALS COLLECTED
BY E. W. NELSON IN THE STATES OF
COLIMA AND JALISCO, MEXICO.

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The well known ornithologist, Mr. E. W. Nelson, whose zeal and indefatigable energy have led him to penetrate many remote and little-known regions for the purpose of collecting mammals and birds, and whose efforts have been rewarded by the discovery of many new species—from the Arctic regions as well as the arid deserts and lofty mountains of the United States—has recently directed his steps into Mexico, in the interest of the United States Department of Agriculture.

Diagnoses are here given of nine new mammals contained in the collections sent by him from Colima and Jalisco, in addition to the new genus and species just described (*Xenomys nelsoni*)*. Illustrations of cranial and dental characters will appear in a later paper.

Genus Geomys.

The collection contains three new pocket gophers of the genus *Geomys*: a small species from the high mountains of Jalisco (*G. nelsoni*); a large species from the plain of Colima (*G. fumosus*), and a large species from the valley of Zapotlan (*G. gymnurus*). They may be known from the following descriptions:

***Geomys nelsoni* sp. nov.**

Type No. $\frac{33522}{522}$ old ♂. U. S. National Museum (Department of Agriculture collection). From north slope of the Sierra Nevada de Colima, Jalisco, Mexico (altitude 1,980 meters, or 6,500 feet), April 11, 1892. Collected by E. W. Nelson. (Original number, 2436.)

Measurements (in millimeters, taken from dry skin of type, slightly overstuffed; this is the largest and oldest of the

* Proc. Biol. Soc. Wash., vol. vii, Sept., 1892, pp. 159-163.

seven specimens).—Total length, 250; tail vertebrae, 80; hind foot, 30.

Cranial Measurements.—Total length of skull of type, 42; basilar length (inferior lip of foramen magnum to posterior rim of alveolus of incisor), 35; zygomatic breadth, 25; upper molar series on alveolae, 9.

General Characters.—Upper incisors bisected by a median sulcus; size smallest of the known species; nose with a vertically elongated naked pad or callosity, above which the hairs are short, stiff, with the tips worn off; tail rather long and naked; claws moderate; color deep and bright chestnut above and below, much deeper than in *Geomys tuza* from Florida and the eastern Gulf region. An immature but full-grown specimen (No. 33585) is dusky in color, and one in the molt has the anterior parts chestnut and the posterior dusky.

Cranial Characters.—*Geomys nelsoni* differs so widely from any of the species having the upper incisors bisected by a single groove that detailed comparison is hardly necessary. Contrasted with *G. clarkii* from the Rio Grande region, it may be distinguished at a glance by its much smaller size, more squarely truncated zygomatic arches, absence of triangular plate at the antero-inferior angle of the zygomatic arch, relatively longer and more slender nasals, smaller and more smoothly rounded audital bullae, and mastoids which occupy much less space on the occipital plane, where they present a subquadrangular surface.

Mr. Nelson states that the species "was found only in some fields at the upper ranch at the foot of the main north slope of the Sierra Nevada de Colima, Jalisco, in the upper border of the lower pine belt, at about 6,500 feet altitude, where it was common, and was found in company with the large species" [here described as *Geomys gymnurus*]. Seven specimens were secured.

***Geomys fumosus* sp. nov.**

Type No. $\frac{33302}{207}$ ♂ ad. U. S. National Museum (Department of Agriculture collection). From Colima City, Mexico, March 27, 1892. Collected by E. W. Nelson. (Original number, 2338.)

Measurements (in millimeters, taken in flesh by collector).—Total length, 292; tail vertebrae, 80; hind foot, 41.

General Characters.—Size medium, about equalling *G. bursarius*;

upper incisors with a single median sulcus; pelage coarse, but not nearly so harsh as in *G. hispidus*; fore claws rather weak for a *Geomys*; tail appearing naked, but sparsely sprinkled with a few inconspicuous hairs; hind feet nearly naked; belly scant haired, the skin showing through; no nasal pad. *Geomys fumosus* seems to be more closely related to *Geomys hispidus* than to any other known member of the genus, but it is smaller than *hispidus*; much darker in color; the sulcus in the upper incisor is median instead of lateral; the cranium is much narrower and less flat interorbitally, and the angular processes of the mandible are conspicuously longer and project out laterally to a much greater distance.

Color.—Upper parts dark sooty brown, the tips of the hairs faintly washed in places with reddish brown; under parts indistinctly paler.

Mr. Nelson contributes the following information respecting the haunts of this species: In the vicinity of Armeria, at an altitude of about 200 feet above the sea, a few pocket gopher's hills were found, but none of the animals were taken. From there up the course of the Armeria river on the plain of Colima the hills become more and more numerous until from about 800 to 2,500 feet they are common in places. In a flat overgrown with wild fig, mesquit, and cocoanut palm trees near Colima City I secured eleven of these animals. They seem to live in isolated and limited colonies, between which, in apparently equally favorable ground, they occur singly and rarely. One colony of considerable size occupies an open grassy area in the limestone belt between Colima and the volcano. Others were seen along the sandy border of the Armeria river bottom, where a growth of low bushes had started up, and another in some thick thorny woods on a dry bench bordering the Colima river a few miles below the city.

***Geomys gymnurus* sp. nov.**

Type No. $\frac{33379}{45674}$ ♀ ad. U. S. National Museum (Department of Agriculture collection). From Zapotlan, Jalisco, Mexico, April 16, 1892. Collected by E. W. Nelson. (Original number, 2460)

Measurements (in millimeters, taken in flesh by collector).—Total length, 342; tail vertebrae, 93; hind foot, 50.

General Characters.—Size very large, about equalling *G. mexicanus*, but differing conspicuously from that species in having the tail naked instead of hairy. Upper incisors with a single median furrow. Color of type and other specimens from the Zapotlan valley, uniform reddish brown with a dusky or fuliginous patch behind each ear and a larger one on the nose. Specimens from the base of the neighboring mountains (Sierra Nevada de Colima, Jalisco), here referred to the same species, are much darker, and two from high altitudes are uniform dark sooty-plumbeous. The latter, Mr. Nelson states in his notes, occur in company with the small species here described as *Geomys nelsoni*.

The skull of this species is huge, and the under jaw in particular bears a striking superficial resemblance to that of *Aplo-dontia*. The angular processes project out laterally to a considerably greater distance than in *Geomys mexicanus*.

Genus **Neotoma**.

The collection contains a series of two heretofore unknown species of *Neotoma*. The first of these, obtained at Manzanillo, in the state of Colima, is the largest and handsomest species known, and I take pleasure in naming it *Neotoma alleni*, after Dr. J. A. Allen, of the American Museum of Natural History, in New York, in recognition of his valuable contributions to the mammalogy of Mexico. It is remarkable that so large and conspicuous an animal should have escaped description until the present time, particularly since it is common in the immediate neighborhood of one of the principal seaports of western Mexico. In the pattern of the enamel folds of the last lower molar it differs conspicuously from typical *Neotoma*, as pointed out in detail beyond, and may merit subgeneric recognition. It is represented by more than 20 specimens in excellent condition.

The other species (*N. tenuicauda*) is much smaller, less than half the size of *N. alleni*, and was obtained in the Sierra Nevada de Colima, in the state of Jalisco. It is represented by seven specimens.

The two species may be known from the accompanying descriptions:

***Neotoma alleni* sp. nov.**

Type No. $\begin{smallmatrix} 32709 \\ 44632 \end{smallmatrix}$ ♂ ad. U. S. National Museum (Department of Agriculture collection). From Manzanillo, Colima, Mexico, January 26, 1892. Collected by E. W. Nelson. (Original number, 1796.)

Measurements (in millimeters, taken in flesh by collector).—Total length, 47.2; tail vertebræ, 22.5; hairs, 4; hind foot, 4.6; ear (in dry skin) from anterior root, 2.9.

General Characters.—Size much larger than any species heretofore described; ears rather large and sparsely clothed with fine hairs on the posterior surfaces; tail shorter than the head and body, blackish, sparsely haired, the annulations and scales distinctly visible above as well as below; upper parts deep tawny-red or rusty.

Color.—Upper parts from forehead to base of tail deep fulvous or tawny-ferruginous; nose and sides of face mouse-gray, tinged with bluish in some specimens; under surface whitish, the tips of the hair only being white and the plumbeous basal portion showing through; upper surfaces of feet whitish, more or less clouded with dusky; tail blackish all round.

Cranial Characters.—Skull largest of the genus. Total length of type, 5.3; basilar length (from inferior lip of foramen magnum to posterior alveolus of incisor), 4.4; zygomatic breadth, 2.75; length of upper molar series on alveolus, 1.1; cranium strongly marked by muscular impressions; superciliary ridge strongly elevated and continued posteriorly across the outer half of the parietals and interparietal to the occiput; interparietal subquadrate with a postero-lateral wing on each side; ascending ramus of premaxillary short, barely reaching plane of lacrymals, and but slightly exceeding the nasals; antorbital slit with a tubercle at inferior base; audital bullæ small, connected by a bony process with the hamular processes of the pterygoids; molar series very large and heavy, about one-fourth the basilar length of the skull; first and second upper molars with a lateral closed triangle on each side; last lower molar shaped like the letter **S**, as in *Xenomys*, but differing from *Xenomys* in having a shallow reëntrant angle on the outer side opposite the deep fold from the inner side; infracondyloid notch of mandible broadly open and but slightly concave.

Mr. Nelson writes that in the neighborhood of Manzanillo this

large and handsome wood rat "is abundant everywhere on the lower parts of the wooded hill slopes and adjacent dry ground covered with mesquite and other seed-bearing trees. It is strictly nocturnal, and usually lives in holes or burrows at the foot of a tree or under some convenient shelter, from which its pathway or trail, neatly cleared of brush, leaves, and twigs, leads away. It lives also in ledges of loose rock, and in a few such places small collections of sticks, shells of land crabs, and other *Neotoma* bric-a-brac were found. These were rare, however. Where the animals are common these trails intersect one another and form a network on the brush and tree-covered slopes. Sometimes their runways reach down on the low wooded flats close to the coast, but they are not common in such places."

Neotoma tenuicauda sp. nov.

Type No. $\frac{33594}{45629}$ ♂ ad. U. S. National Museum (Department of Agriculture collection). From north slope of the Sierra Nevada de Colima, Jalisco, Mexico (altitude 3,650 meters, or 12,000 feet), April 13, 1892. Collected by E. W. Nelson. (Original number, 2446.)

Measurements (in millimeters, taken in flesh by collector).—Total length, 340; tail vertebræ, 160; hind foot, 31.

General Characters.—Size smallest of the known species, being slightly smaller even than *N. mexicana*; tail slender and sparsely haired, bicolor; ears rather small, sparsely haired; fore feet soiled white; hind feet whitish, clouded with dusky.

Color.—Upper parts dark brown, more or less suffused with yellowish fulvous, particularly on the neck and shoulders, passing into dark fulvous on the flanks and hips; under parts soiled white (the plumbeous basal color showing through), with a salmon patch on the inner side of each axilla; tail bicolor, dusky above and whitish below; fore feet and ankles soiled white; hind feet whitish, strongly clouded with dusky proximally (the dusky fading out in passing over the metatarsals); toes pure white.

Cranial and Dental Characters.—Nasals rather short, not reaching plane of lachrymals, ascending rami of premaxillæ ending on plane of lachrymals; audital bullæ rather large for a *Neotoma*; molar series narrow, with sharply angular prisms; first upper molar with an internal lateral closed triangle; lower molars with

the transverse loops long and narrow, the inner reëntrant angles about twice as deep as the outer; first lower molar with anterior loop double, forming a projecting antero-external loop and an internal lateral loop.

Mr. Nelson says of it: "A small wood rat was found living in crevices in the rocks, at an elevation of 12,000 feet, on the north slope of the Sierra Nevada de Colima." This is in the upper fir belt.

At Zapotlan, in the valley below, he obtained five specimens of a form similar to the present but slightly larger and with concolor tails.

Genus **Sitomys**.

Among the small rodents collected are numerous specimens of two mice which in general appearance look almost precisely like the common house mouse (*Mus musculus*), but are still smaller and have shorter tails. They may be roughly separated into two series, according to size. The smaller is a form (or subspecies) of *Sitomys taylori*, which was described by Mr. Oldfield Thomas a few years ago from specimens obtained at San Diego, Duval county, Texas; the larger apparently is an undescribed species, here designated as

Sitomys musculus sp. nov.

Type No. $\frac{33437}{45460}$ ♂ ad. U. S. National Museum (Department of Agriculture collection). From near Colima City, Mexico, March 9, 1892. Collected by E. W. Nelson. (Original number, 2055.)

Measurements (in millimeters, taken in flesh by collector).—Total length, 123; tail vertebræ, 48; hairs, 1; hind foot, 17; ear (in dry skin) from anterior root, 5.5.

General Characters.—In size, color, and external appearance *Sitomys musculus* looks almost exactly like a small common house mouse (*Mus musculus*), except that the tail is shorter. It is smaller than any known species of *Sitomys* except *S. taylori*, from which it differs in being somewhat larger, with longer ears and tail and larger hind feet. It is not quite so dark as typical *S. taylori*, either above or below. The hind feet measure 16 or 17 mm., while those of *S. taylori* measure only 13 or 13.5. Twenty-

three specimens have been received from Mr. Nelson from Colima City and Armeria, Colima, and from Plantinar and Zapotlan, Jalisco.

Color.—Upper parts uniform drab-gray, slightly grizzled with black-tipped hairs and faintly tinged with tawny, precisely as in *Mus musculus*; under parts buffy, the basal part of the hairs plumbeous, without sharp line of demarkation; tail above, concolor with back; slightly paler below.

Cranial and Dental Characters.—Skull similar to that of *S. taylori*, but larger; first and second upper molars relatively shorter and thicker; anterior cusp of first upper molar not distinctly (if at all) bi-tuberculate when young; in *S. taylori* it is conspicuously bi-tuberculate.

Genus *Arvicola*.

Mr. Nelson obtained a series of 18 specimens of a new species of *Arvicola* on the Sierra Nevada de Colima, in the state of Jalisco, Mexico, during the latter part of April, 1892. The species belongs to the western section of the subgenus *Mynomes* (characterized by lacking the postero-internal loop of the middle upper molar) and is related to *Arvicola mogollonensis* of Mearns from the pine plateau region of Arizona, but is larger, with the tail and hind feet longer, and is much darker in color. It differs also in cranial characters.

Arvicola phæus sp. nov.

Type No. $\frac{33605}{3640}$ ♀ ad. U. S. National Museum (Department of Agriculture collection). From north slope of the Sierra Nevada de Colima, Jalisco, Mexico (altitude, 10,000 feet), April 21, 1892. Collected by E. W. Nelson (Original number, 2516.)

Measurements (in millimeters, taken in flesh by collector).—Total length, 155; tail vertebrae, 34; hairs, 4; hind foot, 20½; ear from anterior root, 14 (in dry skin).

Color.—Upper parts dark bistre, grizzled, and thickly interspersed with long black-tipped hairs; under parts plumbeous, more or less washed with dilute tawny-drab; tail indistinctly bicolor, sooty above, paler below.

Cranial and Dental Characters.—Skull resembling that of *Arvicola mogollonensis* in general form and in the vertical expansion of the middle part of the zygomatic arch and the deflection of the short nasals. The incisive foramina are a little more than $1\frac{1}{2}$ times the length of the premaxillary symphysis; the audital bullæ are large and smoothly rounded; the last upper molar has two lateral closed triangles on its outer side, and the first lower molar has 3 lateral closed triangles on the inner and two on the outer side as in typical *Mynomes*, but the middle upper molar has no trace of the postero-lateral loop characteristic of the members of that section from the eastern part of North America.

Genus *Sorex*.

No shrew of the restricted genus *Sorex* has been heretofore known from Mexico, though a single species has been described by Alston from Coban, Guatemala. It is of special interest therefore to record the fact that Mr. Nelson had the good fortune to secure specimens of two species on the north slope of the lofty Sierra de Colima, in Jalisco, neither of which appear to have been described.

One of these, which I have named *Sorex oreopolus*, was found in *Arvicola* runways in grassy places at an altitude of 3,050 meters (10,000 feet); the other, here named *Sorex saussurei*, was captured at the base of a rocky ledge in a sheltered cañon at an altitude of about 2,440 meters (8,000 feet). The latter species may be readily distinguished from the former by its much longer ears and tail, by the color of its under parts, and by cranial proportions. In the relative size of the lateral unicuspidate teeth both of these shrews resemble *Sorex dobsoni* from the Saw Tooth mountains of Idaho, though the height of the teeth is much less.* The first and second upper unicuspid are subequal; the third and fourth likewise are subequal and about half the size of the first and second; the fifth is in the tooth row and distinctly visible from the outside, but is considerably smaller in *saussurei* than in *oreopolus*.

Three specimens of *S. oreopolus* and two of *S. saussurei* were obtained. They may be known from the following descriptions:

* See North American Fauna, No. 5, 1891, p. 33.

Sorex oreopolus* sp. nov.

Type No. $\frac{33663}{45698}$ ♂ ad. U. S. National Museum (Department of Agriculture collection). From the Sierra de Colima, Jalisco, Mexico (altitude, 10,000 feet), April 22, 1892. Collected by E. W. Nelson. (Original number, 2517.)

Measurements (in millimeters, taken in flesh by collector).—Total length, 106; tail vertebrae, 36; hairs, $1\frac{1}{2}$; hind foot, 13.

General Characters.—Size rather large; tail short; ears short, scarcely protruding beyond the fur.

Color.—Upper parts uniform sepia-brown, with a 'pepper-and-salt' appearance; under parts uniform drab; tail bicolor, concolor with the upper and lower surfaces of the body, but darker near the tip on the under side.

Cranial and Dental Characters.—Skull smaller than that of *S. oreopolus*, with rostral portion narrower and more compressed; first and second lateral unicuspidate teeth subequal and largest; third and fourth subequal and about half as large as the first and second; fifth rather large, plainly visible to the unaided eye from the outer side, and wholly in the tooth row; considerably longer antero-posteriorly than in *S. saussurei*.

Sorex saussurei† sp. nov.

Type No. $\frac{33667}{45702}$ ♀ ad. U. S. National Museum (Department of Agriculture collection). From the Sierra de Colima, Jalisco, Mexico (altitude 8,000 feet), April 23, 1892. Collected by E. W. Nelson. (Original number, 2538.)

Measurements (in millimeters, taken in flesh by collector).—Total length, 115; tail vertebrae, 48; hind foot, 14.

General Characters.—Size about equalling that of *Sorex oreopolus*, but with tail and ears considerably longer (tail about as long as the body without the head; ears protruding conspicuously beyond the fur).

Color.—Upper parts sepia-brown, slightly darker posteriorly; under parts drab-gray on the throat and breast, clouded with

* ὄρεοπόλιος, mountain-haunting.

† Named in honor of Professor Henri De Saussure, of Geneva, Switzerland, who described a number of new mammals from Mexico more than thirty years ago. (Rev. et Mag. Zool., xii, 1860; xiii, 1861; xv, 1863).

sooty over the belly; tail above concolor with the back, slightly paler on the basal half below.

Cranial Characters.—Skull somewhat larger than that of *S. oreopolus*, with rostral portion more swollen; first and second lateral unicuspidate teeth subequal and largest; third and fourth subequal and about half the size of the first and second; fifth in the tooth row and distinctly visible from the outside. Though the first and second unicuspids are apparently equal in height, the second is really slightly larger than the first owing to its higher point of origin.